WHAT IS CLAIMED IS:

1. An optical head device, comprising:

a light source;

a condensing lens that collects light emitted from the light source onto an information layer as a target among a plurality of information layers included in an optical information recording medium;

an optical element that collects (a) light reflected from the target information layer and (b) light reflected from adjacent information layers that are adjacent to the target information layer at positions different from each other in the direction of optical axis;

a light receiving element that detects each reflected light collected by the optical element and obtains a detection signal; and

arithmetic circuitry that obtains a reproduction signal using the detection signal,

wherein the light receiving element comprises: a first light receiving portion that detects a first detection signal from reflected light containing the light reflected from the target information layer; a second light receiving portion that detects a second detection signal from light reflected from a first adjacent information layer located at a position more distant from the condensing lens than the target information layer among the adjacent information layers; and a third light receiving portion that detects a third detection signal from light reflected from a second adjacent information layer located on a side closer to the condensing lens than the target information layer among the adjacent information layers and

the arithmetic circuitry multiplies the second detection signal by a constant K that is determined in accordance with a space between the target information layer and the first adjacent information layer and multiplies the third detection signal by a constant L that is determined in accordance with a space between the target information layer and the second adjacent information layer, and performs a differential operation to subtract the second detection signal multiplied by K and the third detection signal multiplied by L from the first detection signal.

2. The optical head device according to claim 1,

wherein the optical element is an astigmatic element that imparts astigmatism to light reflected from the optical information recording

medium,

the light receiving element is disposed at a position such that the light reflected from the target information layer forms a circle of least confusion on the first light receiving portion, and

the second light receiving portion and the third light receiving portion are provided on the periphery of the first light receiving portion, wherein the second light receiving portion is disposed at a position where the light reflected from the first adjacent information layer becomes an ellipse and the third light receiving portion is disposed at a position where the light reflected from the second adjacent information layer becomes an ellipse.

3. The optical head device according to claim 2, wherein the first light receiving portion is made up of four light receiving patterns, the four light receiving patterns being arranged so that two opposing pairs of light receiving patterns are in directions of two focal lines.

4. The optical head device according to claim 1,

wherein a ratio (K/L) of the constant K to the constant L is determined using a space between the target information layer and the first adjacent information layer and a space between the target information layer and the second adjacent information layer, and

the constants K and L are determined using the ratio.

5. The optical head device according to claim 1, further comprising memory that stores a table of optimum constants that correspond to spaces between mutually adjacent information layers, the table being determined beforehand by learning,

wherein the constants K and L are determined using the table so as to use a space between the target information layer and the first adjacent information layer and a space between the target information layer and the second adjacent information layer.

6. The optical head device according to claim 1, wherein the constants K and L are determined by initial learning.

7. The optical head device according to claim 1,

wherein the constant K, which concerns the light reflected from the first adjacent information layer and received by the light receiving element, is determined by using a ratio of an amount of the light received by the first light receiving portion to an amount of the light received by the second light receiving portion, and

the constant L, which concerns the light reflected from the second adjacent information layer and received by the light receiving element, is determined by using a ratio of an amount of the light received by the first light receiving portion to an amount of the light received by the third light receiving portion.

8. The optical head device according to claim 1, further comprising a unit for detecting a space between layers that detects spaces between mutually adjacent information layers by using focal error signals, the focal error signals being obtained by scanning the condensing lens in a direction of an optical axis with respect to the plurality information layers included in the optical information recording medium.

9. An optical information reproducing device, comprising:

an optical head device; and

a driving mechanism that drives an optical information recording medium,

wherein the optical head device, comprises:

a light source;

a condensing lens that collects light emitted from the light source onto an information layer as a target among a plurality of information layers included in the optical information recording medium;

an optical element that collects (a) light reflected from the target information layer and (b) light reflected from adjacent information layers that are adjacent to the target information layer at positions different from each other in the direction of optical axis;

a light receiving element that detects each reflected light collected by the optical element and obtains a detection signal; and

arithmetic circuitry that obtains a reproduction signal using the detection signal,

wherein the light receiving element comprises: a first light receiving portion that detects a first detection signal from reflected light containing

the light reflected from the target information layer; a second light receiving portion that detects a second detection signal from light reflected from a first adjacent information layer located at a position more distant from the condensing lens than the target information layer among the adjacent information layers; and a third light receiving portion that detects a third detection signal from light reflected from a second adjacent information layer located on a side closer to the condensing lens than the target information layer among the adjacent information layers, and

the arithmetic circuitry multiplies the second detection signal by a constant K that is determined in accordance with a space between the target information layer and the first adjacent information layer and multiplies the third detection signal by a constant L that is determined in accordance with a space between the target information layer and the second adjacent information layer, and performs a differential operation to subtract the second detection signal multiplied by K and the third detection signal multiplied by L from the first detection signal.